

JC20 Rec'd PCT/PTO 06 MAY 2005

ARTICLE 19 AMENDMENT

1. (Amended) A dry mixture of an aggregate material prepared by the steps of:

mixing aggregate materials, one or more kind of a water-soluble binder that is soluble by water at an ambient temperature, and water, to make a mixture;

evaporating the moisture within said mixture during said mixing step such that said mixture is dried and has single-grain structures; and

wherein additional water is added to said dry mixture to form a molding material for molding a mold with said dry mixture.

2. (Amended) A dry mixture of an aggregate material as recited in claim 1, wherein said water-soluble binder is a polyvinyl alcohol having a degree of hydrolysis from 80 mol% to 95 mol% or its derivative; or an α starch or dextrin or its derivative; or both.

3. (Amended) A dry mixture of an aggregate material as recited in claim 1 or 2, wherein said mixture contains from 0.1 wt% to 5.0 wt% of said water-soluble binder based on the total weight of said aggregate granular material.

4. (Amended) A dry mixture of an aggregate material as recited in any of claims 1, 2, and 3, wherein said dry mixture further includes a lubricant.

5. (Amended) A dry mixture of an aggregate material prepared by the steps of:

mixing an aggregate granular material, a water-soluble binder that is soluble by water at an ambient temperature, a cross-linker that is capable of cross-linking with said water-soluble binder, and water;

evaporating the moisture within said mixture during said mixing step to prevent the cross-linking reaction between said water-soluble binder and said cross-linker such that said mixture is dried and has single-grain structures;

and

wherein additional water is added to said dry mixture to form a molding material for molding a mold with said dry mixture.

6. (Amended) A dry mixture of an aggregate material as recited in claim 5, wherein said water-soluble binder is a polyvinyl alcohol having a degree of hydrolysis from 80 mol% to 95 mol% or its derivative; or a α starch or dextrin or its derivative; or both.

7. (Amended) A dry mixture of an aggregate material as recited in claim 5 or 6, wherein said mixture contains from 0.1 wt% to 5.0 wt% of said water-soluble binder based on the total weight of said aggregate granular material.

8. (Amended) A dry mixture of an aggregate material as recited in any of claims 5, 6, and 7, wherein said water-soluble binder or water-soluble binder solution is selected from a carboxylic compound.

9. (Amended) A dry mixture of an aggregate material as recited in claim 8, wherein said carboxylic compound is selected from the group consisting of an oxalic acid, a maleic acid, a succinic acid, a citric acid, butane-tetracarboxylic acid, a methyl vinyl ether-maleic anhydride copolymer, and an isobutylene-maleic anhydride copolymer.

10. (Amended) A dry mixture of an aggregate material as recited in any of claims 5-9, wherein said dry mixture further includes a lubricant.

11. (Amended) A molding process for molding a mold using said dry mixture as recited in any of claims 1-4, wherein said additional water has a normal temperature, and wherein said dry mixture has an ambient temperature, said process comprising the steps of:

freezing said dry mixture with said additional water such that said mixture has single-grain structures;

- charging said frozen mixture into a molding space;
- evaporating the moisture within said charged mixture to cure said charged mixture to mold a mold with said cured mixture; and
- removing said molded mold from said molding space.

12. (Amended) A molding process for molding a mold using said dry mixture as recited in any of claims 1, 2, and 3, wherein said additional water has a normal temperature, and wherein said dry mixture has ambient temperatures, said process comprising the steps of:

- freezing said dry mixture with said additional water such that said mixture has single-grain structures;
- adding a lubricant to said frozen mixture;
- charging said frozen mixture with said lubricant into a molding space;
- evaporating the moisture within said charged mixture to cure said charged mixture to mold a mold with said cured mixture; and
- removing said molded mold from said molding space.

13. (Amendment) A molding process as recited in claim 11 or 12, said process further comprising the steps of:

- before said step of charging said frozen mixture into said molding space, temporarily storing in a vessel a quantity of said frozen mixture that is greater or equal to the quantity of said frozen mixture to be charged one time into said molding space; and

- stirring said mixture within said vessel in a condition in which the frozen moisture within said mixture cannot be thawed, to maintain said single-grain structures in the mixture to be charged into said molding space.

14. (Amended) A molding process for molding a mold, said process comprising the steps of:

- stirring said mixture with said additional water as recited in any of claims 1-3 to cause it to foam;
- charging said foamed mixture into a molding space;
- evaporating the moisture within said charged mixture to cure said charged

mixture to mold a mold with said cured mixture; and
removing said molded mold from said molding space.

15. (Amended) A molding process for molding a mold, said process comprising the steps of:

freezing said dry mixture with said additional water as recited in any of claims 5-10 such that said mixture has single-grain structures;
charging said frozen mixture into a molding space;
evaporating the moisture within said charged mixture to cure said charged mixture to mold a mold with said cured mixture;
causing a cross-linking reaction between said water-soluble binder and said cross-linker; and
removing said molded mold from said molding space.

16. (Amended) A molding process for molding a mold, said process comprising the steps of:

freezing said dry mixture with said additional water as recited in any of claims 5-10 such that said mixture has single-grain structures;
charging said frozen mixture into a molding space;
evaporating the moisture within said charged mixture to cure said charged mixture to mold a mold with said cured mixture;
removing said molded mold from said molding space; and
causing a cross-linking reaction between said water-soluble binder and said cross-linker.

17. (Amended) A molding process for molding a mold, said process comprising the steps of:

freezing said mixture with said additional water as recited in any of claims 5-9 such that said mixture has single-grain structures;
adding a lubricant to said mixture;
charging said frozen mixture with said lubricant into a molding space;
evaporating the moisture within said charged mixture to cure said charged mixture to mold a mold with said cured mixture;

causing a cross-linking reaction between said water-soluble binder and said cross-linker; and

removing said molded mold from said molding space.

19. (Amended) A molding process as recited in any of claims 15-18, said process further comprising the steps of:

before said step of charging said frozen mixture into said molding space, temporarily storing in a vessel a quantity of said frozen mixture that is greater than or equal to the quantity of said frozen mixture to be charged one time into said molding space; and

stirring said mixture within said vessel in a condition in which the frozen moisture within said mixture cannot be thawed, to maintain said single-grain structures in the mixture to be charged into said molding space.

20. (Amended) A molding process for molding a mold, said process comprising the steps of:

stirring said mixture with said additional water as recited in any of claims 5-9 to cause it to foam;

charging said foamed mixture into a molding space;

evaporating the moisture within said charged mixture to cure said charged mixture to mold a mold with said cured mixture;

causing a cross-linking reaction between said water-soluble binder and said cross-linker; and

removing said molded mold from said molding space.

21. (Amended) A molding process for molding a mold, said process comprising the steps of:

stirring said mixture with said additional water as recited in any of claims 5-9 to cause it to foam;

charging said foamed mixture into a molding space;

evaporating the moisture within said charged mixture to cure said charged mixture to mold a mold with said cured mixture;

removing said molded mold from said molding space; and

causing a cross-linking reaction between said water-soluble binder and said cross-linker.

22. (Amended) A core mold for casting an aluminum alloy, said core mold being molded with said molding process as recited any of claims 15-21.

23. (Amended) A core mold is molded with said molding process as recited in any of claims 15-21, wherein the surface of said core mold is coated with a mold wash.